

#### ABSTRACT OF THE DISCLOSURE

A major surface (11) of a large substrate (31), e.g., a sheet of transparent LCD glass, is inspected for defects with high resolution and height sensitivity using an array 5 (13) of optical fibers (15). For each fiber (15), a reference beam of coherent light, which has reflected from the fiber's cleaved end (19), interferes with a measurement beam of coherent light, which has exited the cleaved end (19), reflected from the surface (11), and reentered the fiber (15). The intensity of the interference signal serves as a measure of the distance between the cleaved end (19) and the region (27) of the 10 surface (11) with which the fiber (15) is associated. Insight into the polarization properties of the defect, as an aid to accurate classification, can be obtained by independently monitoring the polarization states of two orthogonal measurement beams.